

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-10 are pending in this case.

In the outstanding Office Action, Claims 1 and 10 were rejected under 35 U.S.C. §102(b) as anticipated by Legall (U.S. Patent No. 5,761,398); Claims 1-6 and 8-10 were rejected under 35 U.S.C. §102(e) as anticipated by Butter et. al. (U.S. Patent No. 6,549,575 B1, herein "Butter"); and Claim 7 was rejected under 35 U.S.C. §103(a) as unpatentable over Butter in view of Sullivan et al. ("Rate-Distortion Optimization for Video Compression", Gary J. Sullivan et al, IEEE Signal Processing Magazine, November 1998, pp. 74-90, cited by IDS, herein "Sullivan").

Claim 1 is directed to a method for compensating for motion prediction and includes:

a hierarchizing step of thinning out pixels of a motion compensating block having a greatest pixel-based size to be taken as an uppermost layer of among blocks with smaller pixel-based sizes, to generate a size-reduced block in a lower layer having a predetermined size-reduction ratio;

a search range determining step of determining motion vector search ranges respectively within the plurality of reference frame images, on the basis of the size-reduced block and other size-reduced blocks, and a plurality of size-reduced reference images reduced in size corresponding to the size-reduction ratios of the sized-reduced block and other size-reduced blocks respectively; and

a detecting step of detecting an optimal motion vector while sequentially changing the pixel-based sizes of the plurality of motion compensating blocks by using each of the motion vector search ranges determined in the search range determining step.

Each of the two rejections of Claim 1 under 35 U.S.C. § 102 is discussed in turn.

The outstanding Office Action asserts that Legall teaches the claim limitations of Claim 1.

Legall describes 3-stage hierarchical motion vector determination in which each stage uses a higher resolution macroblock. Each successive stage refines the motion vector determined/refined by the previous stage.

Legall fails to teach or suggest “a search range determining step of **determining motion vector search ranges respectively within the plurality of reference frame images,**” as recited in Claim 1. In Legall, determining a search range is not taught or suggested because determining a search range is not required. Column 10, lines 32-33, of Legall clearly states that a “**search area in the frame P is similarly decimated,**” where P is described on line 19 of column 10 as the reference frame. Thus, because the reference frame is decimated equally with the macroblock in Legall, a search range within a full reference frame is not determined in Legall as recited in Claim 1.

Further, because Legall fails to teach or suggest a search range determining step as recited in Claim 1, Legall necessarily fails to teach or suggest “a detecting step of detecting an optimal motion vector...**by using each of the motion vector search ranges,**” as recited in Claim 1, as well.

Because Legall fails to teach or suggest at least the features of Claim 1 discussed above, Applicants respectfully request that the rejection of Claim 1 under 35 U.S.C. § 102(b) be withdrawn.

The outstanding Office Action also cites Butter as teaching all of the claim limitations of Claim 1.

Butter describes a motion estimation architecture that uses a downsampled macroblock to find a best match reference frame but then uses the full macroblock and reference frame to determine the motion vector.

Butter fails to teach or suggest a search range determining step as recited in Claim 1. Butter also does not need to determine a search range within a full reference frame because,

as described at column 6, lines 24-42, of Butter, a full “non-downsampled” current macroblock, rather than a downsampled macroblock, is used to determine the motion vector.

Further, because Butter fails to teach or suggest a search range determining step as recited in Claim 1, Butter, like Legall, necessarily fails to teach or suggest “a detecting step of detecting an optimal motion vector...**by using each of the motion vector search ranges,**” as recited in Claim 1, as well.

Because Butter fails to teach or suggest at least the features of Claim 1 discussed above, Applicants respectfully request that the rejection under 35 U.S.C. § 102(e) of Claim 1 and Claims 2-6 and 8-9, which depend therefrom, be withdrawn.

Claim 7 depends from Claim 1 and is, therefore, patentable for at least the reasons discussed for Claim 1. Further, Sullivan, which is also cited against Claim 7, fails to cure the deficiencies of Butter with respect to the features of Claim 1 and is not cited in the outstanding Office Action as teaching or suggesting the features of Claim 1. Thus, Applicants respectfully request that the rejection of Claim 7 under 35 U.S.C. § 103(a) be withdrawn.

The two rejections of Claim 10 under 35 U.S.C. § 102 are now discussed.

Claim 10 is directed to an apparatus for compensating for motion prediction and recites a hierarchizing means, search range determining means and detecting means with analogous features to the steps recited in Claim 1.

Legall does not teach or suggest a search range determining means or a detecting means as recited in Claim 10 for the reasons discussed with respect to Claim 1. Legall describes decimating both the macroblock and the reference frame, thereby eliminating the need for “determining motion vector search ranges respectively within the plurality of reference frame images,” as recited in Claim 10. Further, because Legall does not teach or

suggest determining motion vector search ranges, Legall cannot teach or suggest “detecting an optimal motion vector...using the motion vector search ranges,” as recited in Claim 10.

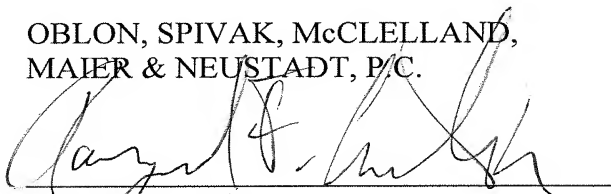
Because Legall does not teach or suggest at least the features of Claim 10 discussed above, Applicants respectfully request that the rejection of Claim 10 under 35 U.S.C. § 102(b) be withdrawn.

Butter does not teach or suggest a search range determining means or a detecting means as recited in Claim 10 for the reasons discussed with respect to Claim 1. Butter uses a downsampled macroblock to find a best match reference frame but then uses the full, non-downsampled, macroblock and reference frame to determine a motion vector, thereby eliminating the need for “determining motion vector search ranges respectively within the plurality of reference frame images,” as recited in Claim 10. Further, because Butter does not teach or suggest determining motion vector search ranges, Butter cannot teach or suggest “detecting an optimal motion vector...using the motion vector search ranges,” as recited in Claim 10.

Because Butter does not teach or suggest at least the features of Claim 10 discussed above, Applicants respectfully request that the rejection of Claim 10 under 35 U.S.C. § 102(e) be withdrawn.

Respectfully submitted,

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